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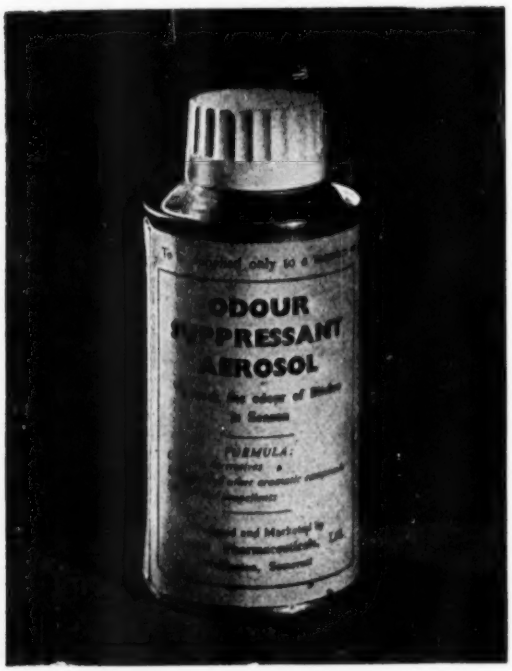


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## *Escherichia coli* Infection in Lambs

BY

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AND

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*SUMMARY.—An outbreak of disease in very young lambs is described. Purulent meningo-encephalitis was present in the two lambs studied in detail. One, which died when three days old, showed, in addition, signs of generalised infection including fibrino-purulent arthritis. In the other, which was killed when a week old, pathological changes were confined almost entirely to the central nervous system. A strain of* E. coli *was isolated from both lambs. The bacterium was rapidly lethal for rabbits by intravenous inoculation, but caused only pyrexia of short duration in 4 3-month-old lambs which were inoculated by the same route. Possible factors associated with natural immunity to the organism are discussed.*

### Introduction

THERE are few published records of ovine disease caused by *Escherichia coli.* Hogarth (1932) in the U.S.A., Sizow (1945) in the U.S.S.R. and Walker (1949) in Australia have reported cases in adult sheep. Roberts (1957) in Australia has described an outbreak of disease in lambs 3 to 4 weeks old, which he attributed to infection by *E. coli.* The clinical picture, although resembling the white scour syndrome in calves, was complicated by involvement of the central nervous system. The principal abnormality seen at necropsy was severe purulent meningo-encephalitis. *E. coli* serotype 078 was isolated in pure culture. Later in the same year Charles reported a similar outbreak in lambs 6 to 8 weeks old in Australia. Lesions were confined to the brain and meninges from which *E. coli* was isolated in pure culture but not typed. More recently Roberts (1958) has given a more detailed account of another outbreak of *E. coli* infection in lambs, localised this time in the joints, with high mortality among those infected. The strain isolated was the same serotype 078 as in Roberts's previously reported outbreak.

The purpose of the present paper is to record briefly an outbreak of disease caused by *E. coli* infection in very young lambs in Britain.

### History

The affected flock comprised 185 lambs, 20 of which, although apparently normal at birth, made little or no attempt to suck. After 24 hours most of the 20 were unable to stand properly or lay struggling vigorously. Death ensued in all cases after 2 or 3 days of illness. Two of the last cases to occur were made available for detailed study.

*Case* 1. Only the skinned carcase, in fairly fresh condition, was submitted. A little fibrinous exudate was found in the peritoneal cavity, on the surface of the liver and in the pericardial sac. There were numerous subendocardial and subepicardial petechial haemorrhages. The gastro-intestinal tract was essentially normal. All the joints contained variable amounts of yellow fibrino-purulent exudate. The meninges were hyperaemic and the cerebrospinal fluid, which was slightly opaque, was present in excess. *E. coli* was isolated in pure culture from the heart's blood, liver, joints, pericardial exudate and brain.

Paraffin sections of brain stained by Ehrlich's haemotoxylin and eosin showed purulent meningo-encephalitis. Masses of neutrophiles filled the subarachnoid space over the entire brain and were particularly dense around blood vessels. These were greatly distended and frequently surrounded by blood. The walls of veins and smaller arteries were frequently degenerated and infiltrated with neutrophiles. Venous thrombosis was commonly observed The reaction extended into the cerebral cortex subjacent to the inflamed meninges, many neurons being swollen or disintegrated and the surrounding tissue diffusely infiltrated by neutrophiles and phagocytic microglial cells. Small haemorrhages were numerous in these areas.

All affected parts teemed with Gram-negative, unevenly stained, coliform bacilli which were also visible in more remote parts of the brain where they filled the perivascular, subarachnoid spaces in the form of dense rings, without apparently eliciting any reaction in the surrounding tissue.

*Case* 2. This animal, a typical case according to the farmer, was submitted alive when 1 week old. Unable to stand, it lay on one side with its head drawn back and its neck flexed like a shepherd's crook. Three of its legs were stretched out in extensor spasm with weak attempts at paddling movements, but the left hind leg tended to remain flexed. Handling of the lamb resulted in extensor spasm of all the limbs, but after a few kicks the left hind leg was flexed again. The lamb was dumb.

The lamb was killed for necropsy by an intracardiac injection of pentobarbitone. Traces of thick pus were found in the navel and there was evidence of fibrinous arthritis in the carpal joints. Purulent exudate had gathered in the sulci of the brain and was visible through thickened leptomeninges. No gross abnormalities were observed elsewhere in the body apart from the generally poor condition of the carcase.

*E. coli* was isolated from the brain only and in profuse, pure culture.

Sections of brain showed severe purulent meningoencephalitis as in Case 1, but more extensive. The meningitic exudate consisted of masses of neutrophiles and many mononuclear phagocytes interspersed with collagen fibres suggestive of incipient organisation. The sections of cerebrum and cerebellum contained large, necrotic areas densely infiltrated with neutrophiles.

### Bacteriology

Isolates from both cases grew well on blood agar and MacConkey's agar, producing mucoid colonies morphologically similar in each case. Biochemical tests showed that they were typical *E. coli* strains. Cross-agglutination tests indicated that both strains were serologically identical. They failed to agglutinate with any of the 40 *E. coli* typing sera used at this laboratory, including one prepared against a strain having the somatic antigen group 078.

### Transmission Experiments

Two young rabbits inoculated intravenously with 0·2 ml. of a saline suspension of the isolated bacteria (No. 2 Brown's opacity tube) incubated overnight on 0·1 per cent. glucose agar died within 20 hours. One of them seen shortly before it died showed hyperæsthesia, conjunctival hyperaemia and convulsions followed by coma. The carcases were septicaemic and the organism was recovered in pure culture from many sites including the cerebrospinal fluid. Microscopical examination of the brain of one rabbit revealed acute meningitis with numerous, Gram-negative, coliform bacilli in the inflamed tissues.

An attempt was made to reproduce the disease in 4 lambs by intravenous inoculation of 1 ml. of a saline suspension of the bacteria (No. 5 Brown's opacity tube). Pyrexia (107° to 108° F.) developed rapidly accompanied by dullness and anorexia, but was followed by complete recovery within 2 days. No gross or microscopical evidence of disease was found in any of the lambs when they were killed between 3 and 5 weeks after inoculation. No bacteria were isolated from blood, cerebrospinal fluid and various tissues including the brain. Owing to the time of year, the lambs used in these experiments were 3 months old when inoculated and therefore much older than the field cases.

### Discussion

The results of this investigation provide additional evidence for the pathogenicity of *E. coli* for young lambs. Our failure to reproduce the disease in lambs by experimental inoculation does not necessarily weaken this evidence ; for very limited age susceptibility to some strains of *E. coli* is well known and was observed in the Australian cases. The resistance to infection of our experimental lambs was not therefore entirely unexpected. There is, too, the possibility that some other factor or some form of stress is necessary to allow the infection to establish itself. The appearance of symptoms in lambs only 24 hours old suggest that such a factor or factors were present at birth.

Another feature is the early tendency to localisation of the infection in the central nervous system of the 2 lambs studied and in the experimental rabbits —a feature also reported by Roberts and Charles (*loc. cit.*). Whether this is a characteristic feature of the strain or the result of a more complicated mechanism is not possible to decide ; but it seems reasonable to suggest that once the infection has established itself in a susceptible animal it may produce a state of generalised infection, with concurrent localisation in the central nervous system, as in Case 1, or, if the host survives, complete localisation may take place.

Although the source of infection remains obscure, the existence of purulent omphalitis in Case 2 suggests a possible portal of entry.

*Acknowledgments.*—The authors are indebted to W. J. Sojka and E. J. Sweeney, MS.R.C.V.S. for the bacteriological investigation, J. Wood, M.R.C.V.S., for bringing the outbreak to their attention and to L. M. Markson, M.R.C.V.S., for constant help and constructive criticism.

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### EXPLANATION OF PLATES

PLATE I.—Case 1. Purulent meningeal exudate around a thrombosed vein. Haematoxylin and eosin. × 125.
PLATE II.—Case 1. Massing of bacteria around a blood vessel. Good pasture. ×400.
PLATE III.—Case 2. Purulent meningitis. The exudate contains a large number of mononuclear phagocytes and neutrophiles. Haematoxylin and eosin. × 125.
PLATE IV.—Case 2. Purulent encephalitis. Area of necrosis with perivascular cuffing and infiltrating neutrophiles. Haematoxylin and eosin. × 125.

PLATE II.

PLATE IV.

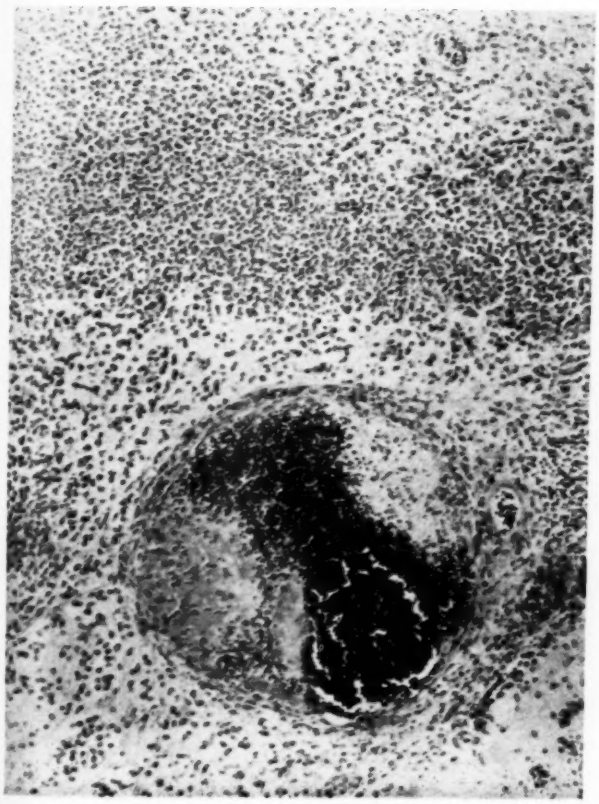

PLATE I.

PLATE III.

# L. M. COBB & J. ARCHIBALD.—INTRAVENOUS UROGRAPHY IN THE DOG

PLATE I.—Urogram taken 10 minutes after the intravenous injection of 50 per cent. sodium diatrizoate. The left pelvis is in full contraction (systole) and the right pelvis is only partially contracted.

# Intravenous Urography in the Dog: a Radiographic Technique Developed from Fluoroscopic Observations

BY

**L. M. COBB and J. ARCHIBALD**

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**Ontario Veterinary College, Guelph, Canada**

*SUMMARY.—1. A number of findings are recorded on fluoroscopic observations made during the excretion of contrast media by the kidney.*

*2. A technique is described for intravenous urography.*

FLUOROSCOPIC studies were made on a number of dogs in the development of a technique of intravenous urography in the dog, and in order to obtain a better understanding of the mechanism of kidney excretion. The technique evolved and a number of important fluoroscopic findings form the basis of this paper.

### The Contrast Medium

Intravenous urography is not a new technique in the veterinary field (Lauder & Heney, 1952; Drury & Dyce, 1953; Bishop, 1953; Tennille & Thornton, 1958), and various contrast media have been advocated for the outline of the canine urinary system. Before the contrast medium of sodium diatrizoate* was selected for use in these studies, an extensive search was made of the medical and veterinary literature. In 1957, Nicolai and Humphries published a comparison of 3 of the most popular contrast media used in human intravenous urography (Neo-Ipax,† Miokon,‡ and Hypaque*); basing their results on a study of 1,500 radiographs, they concluded that sodium diatrizoate was the contrast medium of preference. Its high tolerance and very low toxicity in animals had been well demonstrated by Larsen, Hoppe, and McAuliff (1954). In 1955, Harrod and Frost recorded excellent results with sodium diatrizoate as a urographic contrast medium in cats, and in 1958, Tennille and Thornton, reporting on the use of 6 different contrast media, expressed their preference for this medium. The popularity of sodium diatrizoate is due to the improved diagnostic radiographs it produces, which are in turn due to the fact that sodium diatrizoate has 3 atoms of iodine per molecule while the majority of urographic media at present available only contain 2 atoms per molecule. It is highly water soluble and available as 50 per cent. aqueous solution. A satisfactory dosage rate was found to be 1 c.c. per 2 lb. bodyweight. This rate was increased by as much as 50 per cent. for the smallest animals and decreased by up to 25 per cent. for the heavier dogs.

* Hypaque: Winthrop Laboratories Limited, Windsor, Ontario.

† Schering Corporation, 12, Bond Street, Bloomfield, New Jersey, U.S.A.

‡ Mallinckrodt Chemical Works, Montreal, Canada.

### Pre-operative Preparation

The importance of careful preparation of the animal prior to urography cannot be over-emphasised. The presence of air or coarse ingesta in the region of a kidney or ureter will often mean that it is impossible to make an accurate diagnosis. Twelve hours prior to urography, food and water are withheld from the animal and castor oil, or a similar cathartic, administered. If the cathartic is not successful in cleaning away all the coarse ingesta, a gentle enema is given, great care being taken to avoid the introduction of air into the colon.

Depending on the general condition of the animal it is either heavily sedated or anaesthetised to a stage where it no longer resists being held down on its back and subjected to abdominal pressure by a compression band.

### The Technique for Injection of the Contrast Medium, and Subsequent Radiography

The animal is laid on its back with a 7-inch-wide cotton compression band across the abdomen at the level of the umbilicus, and 2 cardboard boxes are placed one on either side of the thorax. Two wads of absorbent cotton are packed tightly underneath the compression band, one over each ureter. The injection of contrast medium is made into the saphenous vein with a 20-gauge needle over one minute, and the first radiograph taken 5 minutes later with the compression band still applied. In this way an excellent outline should be obtained of the kidney pelves and the proximal fifth of each ureter.

If either kidney appears poorly outlined, the wads of absorbent cotton should be readjusted, the compression band tightened, and the radiograph retaken. The timing for the taking of subsequent radiographs will depend upon the findings of the first radiograph. If both kidneys are very poorly outlined and the compression is correctly applied, there is a strong possibility of there being pathologic changes within the kidney substance; in which case the compression band is kept in place for a further 15 to 30 minutes in an attempt to obtain a higher concentration of sodium diatrizoate in the kidney pelves. If both kidneys appear to be excreting normally, as evidenced by a clear pyelogram, and further studies are required, they are best made within half an hour of the initial injection. For all radiographic exposures after the first, the compression band is applied for 3 minutes and then released 5 seconds before the exposure is made.

### Fluoroscopic Studies

Fluoroscopic observations were carried out on 4

*(Concluded at foot of page overleaf)*

# Observations on Artificial Insemination of Pigs

BY

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*SUMMARY.—An investigation into factors affecting fertility in artificial insemination of pigs was carried out. Pigs inseminated on the day after first signs of oestrus gave better results than those served at other times: those standing well for insemination also had a higher fertility: the use of fresh semen and small-diameter insemination pipettes were also advantageous.*

ALTHOUGH artificial insemination of pigs has been possible for some years, commercial interest in its possibilities was not aroused until the work of Polge (1956) became known. Following this, several cattle breeding centres set up pilot schemes using techniques based on Polge's findings with a view to offering a commercial service. Work in this field started in April, 1955, at this centre, when a stud of four Large White boars was set up. Early results in the field were disappointing in respect of conception rate, although size of litter was adequate, and it became necessary to investigate the reasons for the low fertility rate. Accordingly, since November, 1955, up to December, 1957, a number of factors relating to each insemination performed was recorded and correlated with conception rate as measured by actual farrowing. Conception rates quoted below therefore, refer to the percentage of pigs which produced litters from one insemination. Throughout the investigation inseminations were performed by numerous inseminators in the course of their normal rounds in cattle insemination work. The stud of 4 boars was used throughout, semen from each boar being collected twice weekly at 3- or 4-day intervals. In the great majority of inseminations semen of less than 9 hours old was used.

### Insemination in Relation to Stage of Oestrus

Farmers were asked to notify the centre as soon as possible after signs of oestrus were seen in the female. Calls notified to the centre before 10 a.m. were fulfilled on the same day, while those notified after 10 a.m. were attended to on the following day. In all cases the time of appearance of first symptoms was noted, and Table I shows the relationship between fertility and time of insemination.

It would appear that best results are obtained when insemination is carried out on the day following the first signs of heat, earlier and later inseminations having a lower conception rate.

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**ntravenous Urography in the Dog: a Radiographic Technique Developed from Fluoroscopic Observations**—*Concluded.*

medium-sized dogs following the injection of high doses (2 c.c. per 3 lb. bodyweight) of sodium diatrizoate. These animals received routine pre-radiographic preparation and were anaesthetised with pentobarbitone sodium§ and positioned as for urography (*vide supra*). Five minutes after the completion of the injection of sodium diatrizoate, the compression band was released and the passage of the dye observed under the fluoroscope. The kidney pelves were seen to contract independently of each other and at a rate of from 6 to 10 times a minute. Each contraction seemed to initiate a peristaltic wave which occluded the lumen of the ureter for 1 to 4 centimetres, passing down the ureter at from 15 to 30 centimetres a second. After about 2 minutes the excess dye that had been held back in the kidney pelvis by compression of the ureters had passed into the bladder, and visualisation of the pelves and ureters became poor.

### Discussion

Using the technique described it was always possible to obtain an outline of the kidney pelvis, for even in systole the pelvic processes, though narrow, can be visualised. The phenomenon of the "resting kidney" was never encountered, and the author is inclined to agree with Collery (1955) that this phenomenon is probably due to faulty ureteral compression. Rarely were both pelves at exactly the same stage of systole or diastole (see Plate I), and where this is a constant finding in a series of radiographs of the same animal the existence of pyelitis must be suspected.

Accurate measurements of the rate and length of peristaltic waves were not made, for it was realised that artificial conditions were created in the kidney by the holding back of dye by the compression band prior to fluoroscopy.

Owing to the danger, from direct and scattered radiation, to the radiologist and his assistants during fluoroscopy, lead-lined gloves and aprons were worn and not more than one dog was viewed in any one month.

§ Nembutal: Abbott Laboratories Limited, Montreal, Canada.

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TABLE I

INSEMINATION IN RELATION TO STAGE OF OESTRUS

| First symptom of heat | Total number of inseminations | Percentage C. rate |
|---|---|---|
| Day of insemination ... ... | 31 | 19·3 |
| Day before ,, ... ... | 610 | 27·0 |
| 2 days ,, ,, ... ... | 216 | 19·4 |
| 3 or more days before insemination | 31 | 16·1 |

### Symptoms of Heat in the Female

*Degree of Vulva Swelling*

At the time of insemination the technician recorded in each case the degree of swelling exhibited by the vulva, and the results are classified into 3 degrees, as shown in Table II(a). Since the great majority of inseminations were performed on Large White and Large White crosses vulva swelling was easily detected; it is clear that this symptom is not a reliable guide to the chances of successful service.

TABLE II

SYMPTOMS OF HEAT IN THE FEMALE AND THE EFFECT ON FERTILITY

| (*a*) | Number of inseminations | C. rate percentage | |
|---|---|---|---|
| Much vulva swelling ... | 135 | 23·0 | |
| Some ,, ,, ... | 535 | 25·2 | |
| No ,, ,, ... | 196 | 22·4 | |
| (*b*) | | | |
| Stood well ... ... ... | 536 | 28·4 | |
| ,, fairly well ... ... | 217 } 323 | 21·2 } | 19·8 |
| ,, badly ... ... | 106 } | 17·0 } | |
| (*c*) | | | |
| Vaginal mucus present ... | 215 | 28·4 | |
| ,, ,, absent ... | 578 | 25·4 | |
| (*d*) | | | |
| Norwegian test : good ... | 245 | 31·9 | |
| fair ... | 48 } 69 | 20·8 } | 24·6 |
| bad ... | 21 } | 33·3 } | |

*Behaviour During Insemination*

The readiness with which each female stood to allow the insemination to be carried out was noted and again 3 degrees were assessed and the results are shown in Table II(b). Those which stood well allowed the passage of the catheter and the insemination to proceed without interruption; standing badly indicated constant interruption and a good deal of difficulty in completing the service. It seems from the figures that there is a tendency for better conception in animals which behaved well during service.

*Vaginal Mucus*

Relatively few animals showed the presence of vaginal mucus at the time of service, and in fact the presence or absence of this symptom seemed to have little bearing on the chances of conception (Table II(c)).

*Norwegian Test*

This is a test devised by Aämdal and his co-workers to simulate the behaviour of the boar at service and is intended to indicate the readiness of the female to accept natural service and so presumably to indicate the correct time for insemination. The test consists of the operator lying with his chest on the back of the sow or gilt, facing the same way as the animal and clasping the pig's sides with his forearms. Animals which stood well to this test were regarded as being ready to accept the boar and therefore to be inseminated. The method was tried out at this centre and careful records kept of the reaction of the pigs whose responses were classified in the categories of good, fair or bad. If the response was bad, the animal refused to allow this technique to be practised. Table II(d) shows the results of the trial. There does not appear to be a marked difference in fertility between the 3 degrees of reaction, although the conception rate for the "good" test is somewhat higher than that for the combined "fair" and "bad." One would have expected, however, that the difference would have been larger had the test been of great importance in identifying the correct time of insemination.

### Insemination Techniques

*Semen Rejected*

The dose of diluted semen over the period under review was 100 to 150 ml. and it frequently happened that during or immediately after insemination some portion of the fluid was rejected by the female. Note was taken of the extent of this rejection which was roughly assessed and placed in one of three categories in Table III(a). It is clear that even when half the dose was expelled the effect on conception was insignificant. Over the period the rate of dilution was not more than 1:10, and the above figures would appear to suggest that it might be possible to reduce the volume of the inseminate and/or to increase dilution rates.

*Introduction of Semen*

Since the containers for the diluted semen were made from thin polythene and were collapsible, it was possible to assess the amount of pressure required to expel the semen during insemination. In some cases merely holding up the container was sufficient to allow the semen to flow into the female by gravity, while in others some pressure had to be exerted to expel the fluid. In cases where penetration of the catheter was deep and probably intra-uterine the semen flowed quite freely, whereas pressure was needed when penetration was not deep and presumably insemination was intra-cervical. The figures showing conception rates and degrees of pressure exerted are given in Table III(b), where it will be seen that where continual pressure was exerted fertility appeared to be lowest. It should be emphasised, however, that where no pressure but gravitation was employed the conception rate was not greatly improved, and it seems doubtful if any significance can be granted to the differences in fertility shown.

TABLE III

INSEMINATION TECHNIQUES AND THE EFFECT ON FERTILITY

| (a) | | Number of inseminations | C. rate percentage |
|---|---|---|---|
| Semen rejected : | none ... | 443 | 25·5 |
| | a little ... | 309 | 27·0 |
| | half or more | 84 | 26·2 |
| (b) | | | |
| Semen introduced by : | gravity ... | 147 | 23·2 |
| | pressure | 210 | 18·1 |
| | both ... | 524 | 27·5 |
| (c) | | | |
| Semen age : | under 24 hours ... | 787 | 26·1 |
| | over 24 hours ... | 88 | 14·8 |
| (d) | | | |
| Semen under 24 hours old diluted with :— | glycine ... ... | 375 | 20·2 |
| | citrate ... ... | 407 | 30·6 |
| | milk ... ... | 22 | 22·6 |
| (e) | | | |
| Semen over 24 hours old diluted with :— | glycine ... ... | 56 | 19·6 |
| | milk ... ... | 27 | 7·4 |
| (f) | | | |
| Catheters : | rubber 13 mm. o.d. | 243 | 20·2 |
| | polythene 8 mm. ... | 10 | 20·0 |
| | „ 5 mm. | 49 | 24·5 |
| | „ 3 mm. ... | 339 | 33·6 |
| | Norwegian type ... | 122 | 13·9 |
| (g) | | | |
| Semen deposition : | intra-uterine | 391 | 27·6 |
| | intra-cervical | 307 | 24·4 |

*Age of Semen*

Most of the semen was used on the same day as collection, although a few inseminations were done with semen over 24 hours old. Table III(c) compares the fertility obtained with fresh and second-day semen and shows an appreciable fall with the older semen.

*Dilutors*

Three dilutors were employed over the period. The egg yolk-glycine mixture (Polge, 1956), yolk-citrate dilutor as used for routine bull semen dilution, and heat-treated skim milk which had been held at 97° C. for 10 minutes. The glycine and milk dilutors were each kept at 5° C. after adding the semen, while the yolk-citrate diluent was kept at room temperature. The results on first day semen using these 3 dilutors are given in Table III(d), where it will be seen that there is little to choose between the 3, although the citrate promises well.

Since boar semen in citrate dilutor cannot be stored at 5° C. it was not used in "second day" semen, but a comparison between the "glycine" and "milk" dilutors for semen over 24 hours old is given in Table III(e). Here the figures are very small, but it can be seen that the "milk" dilutor gives a very low conception rate as compared with the glycine dilutor which gives a rate very similar to that which is achieved with first day semen.

*Catheters*

Five different types of catheter have been used for insemination, the thick rubber tube described by Polge (1956) and several sizes of polythene tubing, as well as the Norwegian catheter with an inflatable cuff to prevent backflow of the semen (Aämdal, 1957). The outside diameter of each type of catheter is given with the results obtained in Table III(f). In order to pass the 5 mm. and 3 mm. catheters, a metal rod was passed along the lumen and withdrawn when the catheter was *in situ*. The other catheters were sufficiently rigid in themselves to make this unnecessary. While the figures for the 8 mm. and 5 mm. catheters are small, there does appear to be a suggestion of a rise in conception rate as the diameter of the tube decreases. This may be because of the greater penetration which can be achieved with the smaller tubing. Results with the Norwegian catheter were disappointing.

*Site of Deposition of Semen*

With practice one can assess the depth of penetration of the catheter both by feel and by the length of tubing inserted, as well as by the flow of the semen. It was thus possible to tell whether an insemination was probably intra-uterine or intra-cervical. It is appreciated that this is by no means a wholly satisfactory method of obtaining this kind of information, but it was felt that it might be of some assistance to abstract figures on this basis. Clearly, however, no significant difference exists between the two sets of figures shown in Table III(g).

**General**

*First and Repeat Inseminations*

The conception rates for these two categories are given in Table IV(a), where clearly no difference is apparent.

TABLE IV

| (a) | | Number of inseminations | C. rate percentage |
|---|---|---|---|
| First inseminations ... ... | | 544 | 24·4 |
| Repeat „ ... ... | | 340 | 24·2 |
| (b) | | | |
| Sows ... ... ... ... | | 575 | 25·8 |
| Gilts ... ... ... ... | | 316 | 23·2 |
| (c) | | | |
| Pig running alone ... ... | | 338 | 24·8 |
| „ „ with others ... | | 485 | 24·6 |

*Sows* v. *Gilts*

There appears to be no important difference in conception rate between sows and gilts, as shown in Table IV(b).

*Presence of Other Pigs*

It was thought possible that absence of other pigs might make heat identification in a sow or gilt more difficult. Figures were therefore collected to compare fertility between pigs which normally ran with others and those which did not have company.

Table IV(c) shows that the fertility of both groups is similar.

*Number of Inseminations per Farm*

Throughout the period it was felt that lack of experience in identifying heat by the farmer might be an important cause of low fertility, and to investigate this figures have been abstracted to compare conception rates between groups according to the number of inseminations done on each farm. Table

TABLE V

INSEMINATIONS PER FARM AND FERTILITY LEVEL

| Number of farms | | Inseminations per farm | | C. rate percentage | |
|---|---|---|---|---|---|
| 92 | | 1 | | 18·5 | |
| 67 | | 2 | | 14·9 | |
| 32 | 229 | 3 | 488 | 15·6 | 16·0 |
| 24 | | 4 | | 16·7 | |
| 14 | | 5 | | 14·3 | |
| 10 | | 6 | | 25·0 | |
| 5 | | 7 | | 14·3 | |
| 9 | 35 | 8 | 267 | 19·5 | 20·6 |
| 10 | | 9 | | 21·1 | |
| 1 | | 10 | | 20·0 | |
| 2 | | 11 | | 27·3 | |
| 2 | 5 | 13 | 63 | 19·2 | 25·4 |
| 1 | | 15 | | 20·0 | |
| 1 | | 17 | | 17·6 | |
| 1 | | 21 | | 14·3 | |
| 1 | 5 | 24 | 116 | 25·0 | 19·0 |
| 1 | | 26 | | 23·1 | |
| 1 | | 28 | | 14·3 | |
| | 274 | | 934 | | |

V shows the results which refer to 934 inseminations carried out on 274 farms : more than half of these were performed on farms with only 1 to 5 services, indicating that the demand for artificial insemination lies, as with cattle, in the small herds. It will be seen that conception rate shows an upward trend as the number of inseminations per farm increases, except in the case of the 5 farms in the 16 to 30 category and it is probable that this is a chance variation. The general upward trend of fertility resembles that already reported by Polge and Rowson (1956), who found increasing conception rates with increasing pig herd size. The probable reason for these trends is the greater experience which farmers acquire in the identification of the heat period and of the correct service time within that period.

**Discussion**

The hope had been that out of the investigation some facts might be discovered which would help to raise the conception rates in artificial insemination of pigs. Research station results have been somewhat better than those obtained using similar techniques in commercial service on farms, and this has been due probably to the use of a vasectomised boar at the research centres for heat identification. It seemed important, therefore, to discover some other reliable method of heat determination which could be used on the farm. In general, little has emerged which can be said to be of significance in this respect, but certainly service on the day following the first symptoms of heat appears to give the best results. Pigs which stand well during insemination similarly have a more satisfactory fertility rate, but other indications of importance in the sow or gilt seem to be absent. In insemination techniques it would seem desirable to use semen as fresh as possible, while glycine buffer seems to be the best diluent for using semen over 24 hours old. There is a suggestion that small diameter catheters are to be preferred to larger, although the difference between intra-uterine and intra-cervical insemination seems to be negligible in terms of fertility. It also appears that chances of conception are better in larger herds than the smaller.

Readers will notice that the conception rates quoted are in general low in relation to results at other centres. This may be due to a large measure to the fact that all inseminations have been carried out by all the inseminators rather than by one or two individuals, as is the case in other centres. Recently the inseminations have been carried out by one individual, and early results show promise of much increased conception rates. This may be an indication that training of inseminators for pig insemination work might have to be a somewhat more serious and prolonged matter than has hitherto been appreciated.

*Acknowledgment.*—The author is appreciative of the co-operation and patience shown by the Board of Management of the centre in the face of consistently disappointing results, and to the staff of the centre for their co-operation in carrying out the techniques and record keeping.

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## TB. ERADICATION IN IRELAND

It is reported that the Irish Minister of Agriculture has announced that British and Irish Government officials reached agreement in recent discussions on the plans to eradicate bovine tuberculosis there. Mr. Smith was speaking at a conference with newspaper representatives at Government Buildings, Dublin.

He told the conference that the scheme includes the declaration of Co. Sligo as an accredited area next December, and Clare and Galway a short while afterwards. It was hoped to declare the whole seven counties of the west an accredited area by the end of 1960, and this would make available 1,250,000 accredited cattle.

The Minister announced that this year the British Government was prepared to accept a minimum of 300,000 once-tested cattle and 400,000 in 1960.

He explained that, even if the British Government allowed in a certain number for a considerable period, the British farmer might not buy them because he would have to isolate the stock for two months. The farmer might decide at any time that it would be less troublesome to buy home stock.

Officials explained that it was impossible to predict when the country would be clear of bovine TB., but it would cost about £2,000,000 a year, or even more, and a total of £15,000,000 as a minimum.

# The Ecological Rôle of Trinidad Bats, Especially the Vampire, and Bat Rabies*

BY

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## Introduction

THE general interest in bats was stimulated in 1953 when, in the United States, insect-eating bats were found to be naturally infected with rabies. Up to December 1958 over 200 rabies positive bats of about 15 species have been found in 19 States from Canada to Mexico and from the Atlantic to the Pacific. Bat rabies has also recently appeared in western Canada. The disease has been known in Mexico for over 50 years and is now widespread over the entire country (Courter, 1954). Blood-drinking vampire bats, fruit-eating bats and insectivorous species have been found to be naturally infected with the virus from Mexico to Argentina. Panama, which recently reported vampire bat rabies from the Costa Rican and Colombian borders, has the added problem of " Murrina, " an equine trypanosomiasis caused by the protozoan blood parasite, *Trypanosoma hippicum*, also transmitted by the vampire bat with cattle acting as reservoir hosts (Dunn, 1932).

Rabies, though erroneously diagnosed, first appeared among the cattle of Trinidad with heavy losses in 1925. In 1929, human beings were affected. Up to 1935, 89 human deaths (Malaga Alba, 1954) were recorded but no cases have been officially reported since that period even though people have been and still are being bitten nightly by vampire bats in Trinidad. In 1936, Dr. J. L. Pawan published his studies which proved that vampire bats were the most important vectors and that frugivorous and insectivorous bats were also infected and that they occasionally acted as transmitters (Pawan, 1936a and 1936b). Since 1935, the incidence in cattle has been cyclic : the last heavy outbreak occurred in 1954 during the rainy season and resulted in the loss of several hundred head, while sporadic cases have continued up to the present time. The Department of Agriculture conducts a livestock vaccination programme, primarily for cattle, which has kept losses to a minimum. Elsewhere in the American tropics livestock losses continue, and human deaths from bat rabies have occurred in Mexico and British Guiana with 2 questionable but possible deaths in the United States (Malaga Alba, 1954 ; Nehaul, 1955 ; and Veterinary Public Health Newsletters, 1955, 1957 and 1958).

Trinidad, with an area of 1,864 square miles and about the size of one of the smallest of the United States—Rhode Island—has approximately the same number of bat species as the entire United States Canada, Alaska and extreme northern Mexico. At present over 60 species of 9 families have been listed for Trinidad and Tobago (Greenhall, 1956) as compared with 65 species *and* sub-species of 3 families found solely within the borders of the United States (Sanborn, 1954).

## Various Species and Their Habitats

Many of the bats thus far recorded are the easily accessible colonial types which inhabit caves, hollow trees and buildings. However, with improved collecting techniques and more intensive searches, especially for the rarer solitary tree or free-living bats, Trinidad and Tobago's bat fauna may well reach 100 species. The bat fauna of northern South America numbers well over 100 different kinds of bats, and this estimated final tally may be on the conservative side for Trinidad lies only 6 miles from Venezuela, and well within bat flight abilities—especially of the vampires which have been known to fly within a radius of 15-20 kilometres in a single night (Malaga Alba, 1954). The bats of the genera *Myotis*, *Lasiurus* and *Tadarida*, natives of the United States, but also found in Trinidad, have been banded with phenomenal recoveries. *Myotis* individuals have returned after being released at various distances up to 228 miles from the point of capture, and there is a record of one flying 36 miles, 12 of which were over open sea, to return to its home site (Cockrum, 1956). Another report mentions a *Tadarida* which was banded at Carlsbad Caverns, New Mexico, and recovered in Jalisco, Mexico, a distance of 810 miles to the south (Twente, 1956).

Our own investigations strongly suggest that bats of different kinds, but particularly vampires, are coming continuously from the adjacent mainland with its very low human and livestock population to Trinidad where there is a more abundant and varied food supply. The recent discovery of the rare White Spotted vampire bat, *Diaemus*, in Trinidad is an excellent example of our supposition. Of the thousands and thousands of the common South American vampire, *Demodus*, which were destroyed in Trinidad after the middle 1930's, *Diaemus*, which lives in the same habitats as *Desmodus* was not discovered until 1954 when it was collected from roosts which had been visited regularly by Government bat collectors ever since the inception of the vampire eradication programme. The additional fact, that vampire bat destruction has been carried on so long without any appreciable diminution of numbers

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or decrease in the incidence of bat biting among people and livestock, further contributes to this evidence. The Hairy-legged vampire, *Diphylla*, a third vampire species, recorded in South and Central America, is suspected in Trinidad and if found will add further weight to this theory. However, the above constitutes only circumstantial evidence and the facts will not be proven conclusively until a bat-banding campaign is carried out in nearby Venezuela and banded bats are recovered in Trinidad.

Bats belong to the order *Chiroptera* which is divided into 17 families distributed throughout the world. Nine of these families occur in the Western Hemisphere and all 9 are represented by one or more species in Trinidad. In size they range from those with mouse-sized bodies and 4-inch wing-spans to those with large rat-sized bodies and wing-spreads of almost 36 inches. Colour varies according to type and may be pure white, as with the Ghost or Jumby bat (*Diclidurus*), or velvet-black as in the free-tailed bats, *Molossus*. Others may be varying shades of red, grey, and brown, with or without facial and body stripes of white. This does not include the odd-coloured fruit bats which periodically turn up and whose coloration of green, yellow and gold is caused by the animals entering ripe mangoes to feed and thus becoming completely stained with fruit juices. Bat faces may be simple and smooth or adorned with a variety of dermal folds called nose leaves, chin leaves, plates, warts and assorted wrinkles. Perhaps the oddest is the Wrinkled faced bat, *Centurio*, that has a chin fold which pulls up shroud-like to cover its completely ball-wrinkled face and head. Another, the Leaf-chinned bat, *Mormoops*, has a complex facial foliage of skin folds, flaps and pads. Practically all members of the family *Phyllostomidae* sprout erect nasal appendages of varying sizes and shapes. The Fish-eating bat, *Noctilio*, has a face which looks like a mastiff dog with a hare-lip. The majority of bats possess scent glands on various portions of their bodies, such as wings, tail, chest, shoulders, head and mouth from which issue assorted odours and secretions variously described from nauseatingly rank to fragrant and whose functions are not fully understood. The vampire *Diaemus* has 2 large mouth glands which cannot be seen when the bat's mouth is closed but which are most conspicuous when the creature opens its mouth and the glands are directed forward like 2 miniature cannons. With open mouth, the bat will suddenly make an explosive hissing sound and then a foul smelling odour seems to come from both barrels which has nauseated several observers.

Trinidad bats are found in a great variety of secluded situations. Preference is shown for caves, hollow trees, and branches, under leaves, on tree trunks and vines, under bridges and culverts, in cisterns and wells, in abandoned machinery, in and under buildings—including attics, basements, eaves, towers, steeples and chimneys. Some bats select special places and the *Tonatia* has been found inside abandoned tree termite nests which were previously occupied by parakeets. The small fruit bats, *Uroderma* and *Artibeus cinereus*, make their own shelters by biting and cutting palm leaves in such a way that the frond folds down and forms a darkened area. The Sucker-foot bat, *Thyroptera*, can cling to the smooth inner surface of newly formed, trumpet-shaped banana leaves by means of suction cups on the bases of its thumbs and feet. The Free-tailed bats, *Molossus*, appear to have a peculiar fascination for the underside of galvanised roofs where temperatures of 130°F. have been recorded. These "house" bats occupy human dwellings in Trinidad by the hundreds much to the dismay of the people who must daily listen to the thumpings and scuttlings of these creatures that run mouse-like over the attic floors. Occasionally they are found in hollow trees or under palm leaves which apparently were their normal roosts before corrugated roofing material was introduced into the island.

### Feeding Habits

In the United States most of the bats feed upon insects while in Trinidad they feed upon the widest variety of foods to be eaten by bats anywhere in the world. Diets vary according to species and include insects, fish, blood, small animals, fruit and nectar. Sanborn (1954) states that "some bats consume, according to estimates, from one-half to their full weight in insects in a day.* Although it may not be known if these insects are beneficial or injurious or both, there would most certainly be a great over-abundance if there were not some agency to hold their numbers in reasonable balance." The large Fish-eating bat *Noctilio* may be seen nightly flying over the Gulf of Paria and gaffing surface-swimming fish with the large claws of the hind feet. The vampires, *Desmodus* and *Diaemus*, with their specialised scalpel-like upper incisor teeth, scoop out bits of skin from livestock and human beings and then lap the flowing blood. The giant Spear-nosed bat or False vampire, *Vampyrum*, with a wing-spread of almost 3 ft., is the largest New World bat and is strictly carnivorous, feeding upon birds, mammals and other bats. The fruit bats of the genera *Carollia* and *Artibeus* attack and damage a wide variety of wild and cultivated fruits but at the same time do an excellent job of seed dispersal and thus propagate a number of economically important trees (Greenhall, 1956). The Spear-nosed or Javelin bat, *Phyllostomus*, varies its diet of fruit with small animals, while the *Glossophagine* bats with their long, brush-tipped tongues feed upon nectar and insects trapped in the nectar. These latter bats are essential to the pollination of certain plants and trees, for example, the Silk Cotton tree, *Ceiba*. The feeding habits of bats should be carefully considered before the wholesale destruction of any species is contemplated.

### Breeding and Mortality

Not much is known about the breeding habits of Trinidad bats but most of them have a single young at a time and 1 breeding season annually. However, the Vampire *Desmodus* may have 2 breeding periods and young have been taken during every month. The gestation period for *Desmodus* is unusually long

* This must be true of *Molossus* in Trinidad—A.M.G.

for the size of the animal and is estimated to be at least 5 months (Wimsatt & Trapido, 1952).

Trinidad bats are a parasitological gold mine and many fascinating ecto- and endo-parasites have been found including : bat flies, the wingless *nycteribiids* and the winged *streblids* ; bat mites, *Spinturnicidae* ; bat bedbugs, *Cimicidae*, bat ticks, and a host of helminths. This field is also wide open for intensive study.

The natural enemies of Trinidad bats probably include such mammals as the Crab-eating raccoon, the Tayra, which is a tree weasel, and the Ocelot, not forgetting of course the bats of the genera *Vampyrum*, *Phyllostomus* and *Desmodus*. Among the birds, there are 5 local owls, all expert bat catchers, and a number of hawks, one of which specialises on bats—the Trinidad Bat Falcon, *Falco r. rufigularis*. There are also a number of snakes such as the " Tigre," *Spilotes* ; " Cribo," *Drymarchon* ; " Macajuel," *Boa* ; " Cascabel," *Corallus* ; and the " Rainbow Boa," *Epicrates*—all of which are more or less arboreal or are found frequenting bat caves.

### Rabies in Bats

No rabid bats have been reported from Tobago, but the following species of Trinidad bats have been proven to be rabies-positive on virus isolation. Unfortunately figures are not available to indicate the percentage of infection among the species :

1. The Ghost or Jumby bat, *Diclidurus albus*, is a very rare solitary insectivorous bat which has a curious gland in the tail membrane. One specimen was caught at mid-day in May, 1932, resting on the shoulders of a cow in the sugar area of Caroni (10).

2. The Naked-Backed bat, *Pteronotus davyi*, is a small insectivorous species whose wings are attached to the top of its body rather than at the sides as is usual, thus forming a completely hairless surface from wing tip to wing tip.

3. The Short-tailed Fruit bat, *Carollia perspicillata*, is probably the most abundant species of colonial fruit bat in the American tropics and certainly in Trinidad. It is found in close association with many types of bats, especially vampires.

4. The Jamaican Fruit bat, *Artibeus jamaicensis*, is a very abundant colonial nose-leaf bat whose range extends throughout the West Indies from Cuba to Trinidad and from Central America to Brazil. In Trinidad it is common in urban districts and has been found in association with vampires. This species (*Artibeus planirostris trinitatus*), " was the first conclusive demonstration of the infection of Trinidad bats with the virus of rabies" (Pawan, 1936a).

5. The Trinidad Fruit bat, *Artibeus lituratus*, is slightly larger than the preceding species and is frequently found sharing the same roost. It also associates with vampires. It is abundant and is found from Mexico to Brazil and the Lesser Antilles.

6. The Vampire bat, *Desmodus rotundus*, is abundant and widespread in the American tropics from the 30th parallel south latitude to the 28th parallel north latitude, but it is absent thus far from any West Indian island with the exception of Trinidad. Over parts of its range it has been taken from areas at sea-level to 11,000 feet (Courter, 1954 ; Malaga Alba, 1954 ; Sanborn, 1954). Pawan proved that *Desmodus* bats, either with or without external symptoms of rabies after natural or artificial infection, are capable of transmitting rabies up to 5½ months and that they can also recover from the furious form of the disease and spread infection for prolonged periods (1936b). A personal observation leads me to suspect that this infective period may be extended to 11 months. Captive vampires have lived in captivity for 12 years, 9 months (Trapido, 1946).

7. The White Spotted Vampire, *Diaemus youngi*, is a very rare South American vampire found in 1954 breeding in Trinidad and up to that time was known only from a few museum skins. It seems to have a predilection for avian blood, for when the colony had its numbers reduced, vampire attacks on poultry in the same area suddenly stopped.

8. The small Free-tailed bat, *Molossus major*, an insectivorous colonial species, is undoubtedly the most abundant house bat found under metal roofs in Trinidad and Tobago. The range of this species extends from the Windward Islands to northern South America.

Of the rabies positive bats recorded in the United States and Mexico at least 7 genera (*Chilonycteris*, *Mormoops*, *Lasiurus*, *Myotis*, *Dasypterus*, *Eptesicus* and *Tadarida*) and in some cases the same species (*Mormoops megalophylla*, *Chilonycteris personata*, *Lasiurus borealis* and *Molossus rufus* (nigricans) occur in Trinidad (Greenhall, 1956) but as yet have not been reported positive so that it is quite likely that other infected bats will eventually be recorded.

### Conclusion

It is evident that bat-transmitted diseases, particularly rabies, is of international public health and agricultural importance and that information, wherever secured, will have valuable bearing on the numerous problems involved in Trinidad and the rest of the world. However, the bats themselves require further intensive ecological study in order to understand fully the important role these flying mammals play in the scheme of nature. Serious consideration should be given to the multitude of factors involved before any full-scale control measures are directed against any species which might upset completely the delicate balance of nature.

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Clinical Note

# Two Cases of Suspected Bovine Malignant Catarrh

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## Introduction

THIS condition is described by Udall as occurring in the U.S.A., Europe and Africa and is known as "Snotsiekte." According to Kelly, sporadic cases occur in this country.

It is our impression that this condition is relatively uncommon in Great Britain ; if, however, it is more common than we believe then it is hoped that this note will stimulate others to discuss their cases and to find out more about this condition.

In our opinion there is little doubt as to the diagnosis in Case 2 as the symptoms and lesions are in close agreement with the recorded descriptions. In Case 1, however, the diagnosis is less certain ; but it was felt that as this occurred only a few days before Case 2 on the same farm, and as the symptoms were fairly typical of the peracute intestinal form of the disease, it was reasonable to diagnose the condition as bovine malignant catarrh. The condition in Case 2 could be differentiated from mucosal disease by the ocular lesions.

It has been suggested that sheep may act as an intermediate host and sheep were present on this farm.

## Case 1

*Subject.* An 18-month-old Friesian cross heifer.

*History.* The owner had noticed that this heifer was standing away from the other young stock on the day before we examined her.

The stock had been grazing an old ley.

*Symptoms.* On October 16th we were asked by the owner to visit the heifer which was reported to be dull and passing blood in the faeces. On examination, the heifer which was in poor condition, was found to have a profuse fetid diarrhoea mixed with strands of fibrin and blood. She appeared to be very weak, especially on her hind legs, and she walked with a wobbly gait.

A tentative diagnosis of coccidiosis was made and treatment with sulphadimidine was started.

Post-mortem *Examination.* On October 17th the owner informed us that the heifer had died. A *post-mortem* examination was carried out next day.

The mucosa of the large and small intestine was haemorrhagic and the contents were fluid and were mixed with blood. There were no other gross lesions. An examination for coccidial oocysts in the intestinal contents and on the intestinal mucosa was carried out with negative result.

## Case 2

*Subject.* A 4-year-old dehorned Shorthorn cow.

*History.* The same owner reported that this cow had gone blind overnight without showing any previous abnormality. She had been grazing with the dry stock in a different field to Case 1.

*Symptoms.* This cow was examined on October 27th and showed a slight bilateral corneal opacity, injected sclera, protrusion of the third eyelid and lachrymation.

Some degree of hyperexcitability was present. Treatment was by the injection of a magnesium and dextrose solution.

On October 29th we were called in to a case of dystokia in this cow which was about a week premature. After correction of a carpal flexion posture a dead calf was removed by traction. The cow showed no excitability and apart from the corneal opacity being more pronounced she appeared normal.

On October 30th the cow was dull and showed an accelerated respiration.

On auscultation pneumonic sounds were present ; the temperature was 105° F. and the pulse rate was very fast. There was a colourless nasal discharge and a swelling around the eyes was noticed. The owner remarked that the cow appeared to have a "big head." Treatment consisted of an injection of 4 g. of streptomycin.

On the following day the animal was very depressed, the temperature was 103° F., respirations were very fast and shallow. The eyes were protruding and were now quite opaque, but it was possible to see an accumulation of cloudy material in the anterior chamber. The nasal discharge was thick and yellow. The mucous membrane of the muzzle was peeling and leaving raw areas. There was necrosis and separation of the buccal mucosa resulting in a very profuse salivation.

The skin of the teats had sloughed leaving behind a raw and bleeding area.

Early slaughter was advised but the cow died during the night.

Post-mortem *Examination.* The carcase was examined on November 1st and was in poor condition.

Examination of the head revealed a necrosis and separation of the mucosa in varying degrees. There was almost complete loss of the mucous membrane of the pharynx, muzzle, nasal cavity and the turbinate bones ; and lesser inflammatory changes on the tongue, mouth, larynx, upper trachea and upper oesophagus.

Both eyes were affected with corneal opacity, cloudy material in the anterior chamber and cataracts.

There was an inflammation of the mucosa of the abomasum.

The lungs showed venous congestion but there was no gross pneumonic lesions.

The teat lesions were as those already described.

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# Current Literature

## BOOK REVIEWS

**Parasitic Animals.** By Dr. GEOFFREY LAPAGE. W. Heffer & Sons Ltd., Cambridge, 1958. 25s.

It is inevitable that superficiality must be the predominant characteristic of an age of specialisation. The specialist can show only a casual interest in subjects other than his own and it follows that there must be an increasing demand for more or less superficial books to satisfy this more or less superficial curiosity. It is assuredly this demand which has called forth a second edition of Dr. G. Lapage's " Parasitic Animals."

Dr. Lapage writes about the sort of problems and phenomena that constitute the science of parasitology. To this extent he writes of parasitology rather than of parasites. He allows his readers to peep as if through a shop window and like an accomplished salesman he displays his samples in such an attractive manner as must surely arouse some curiosity as to what might be stored within the shop.

When Dr. Lapage relinquishes the role of salesman and is tempted to play the schoolmaster he sounds a little less convincing. System, order, method, classification there must be but one is left wondering whether the samples have not been so selected as to defy orderly arrangement. Thus, when a section on " Effects on the Parasite " is set beside one on " Effects on the Host " it is not only the pedantic who might feel bewildered when they find that in the one case the effect discussed is an evolutionary one and in the other a pathological or immunological one. Again, a classification of life cycles by numbers and initial letters savours rather incongruously of those little volumes that are designed to be learnt by rote by the less intelligent type of medical or veterinary student.

All Dr. Lapage's artistry as a storyteller cannot conceal this difficulty of reducing a mass of heterogeneous material to some kind of discipline, a difficulty inherent in the subject itself, for a subject circumscribed by such an arbitrary line can hardly be expected to lend itself to any very methodical treatment. Indeed the definition of a parasite lies at the bottom of most of the curiosities encountered in this book. Among these the closely argued contention that a human embryo should not be classified as a parasite because the health of the mother not infrequently improves during pregnancy bears the unmistakable mark of the scholastic.

The essential criterion that the one partner in a parasitic association must live at the expense of the other, contributing nothing and harming its host must make it virtually impossible to avoid an anthropocentric approach. Indeed the parasite is presented by many writers as a homunculus with hopes and fears, successes and failures, a homunculus of such fiendish ingenuity that, like an emperor's eulogist, a popular writer may hope to bask in its reflected glory. One must be grateful to Dr. Lapage for resolutely resisting this temptation. Equally one must praise his skill in producing a very readable volume.

**Diseases and Parasites of Poultry.** By E. H. BARGER, L. E. CARD and B. S. POMEROY (1958). Henry Kimpton, London. 5th Edition. Pp. 408. 84 illustrations. 37s. 6d.

The 4th edition of " Barger and Card's " text-book on the diseases and parasites of poultry appeared 9 years ago followed by 2 reprints, and it is a tribute to the book's popularity and usefulness that another edition is now forthcoming. The new edition on the whole is disappointing. It cannot be said to have been brought completely up to date, and perpetuates still many of the deficiencies of the earlier editions. No gross changes in format have been made, and the authors have adhered to their previous policy of endeavouring, to quote from the preface, " to present material which is scientifically accurate, and yet not so technical as to be difficult to understand and put into practice." With this in view, the object of which is presumably to make the book attractive to non-scientific readers, much information which would have been of prime interest to veterinarians has been omitted. The first 5 chapters dealing with (1) The Mortality Problem; (2) The Nature of Disease; (3) The Anatomy of the Fowl; (4) Poultry Surgery, and (5) Diagnostic Methods will be of greater interest to non-scientific readers, to whom they are obviously directed. One would have thought, however, that more recent figures for mortality rates both in laying trials and commercial flocks (broiler units are not mentioned), are available than those quoted in the text, and in Tables 1 and 2 (p. 12): whilst the statement on page 8 in connexion with infectious coryza that " with the knowledge that recovered birds are carriers, it became a simple matter to isolate all young stock, and to prevent any contact with older fowls. In this way the problem of controlling coryza became an easy one " will not be endorsed by the majority of poultry keepers. Further in the chapter on poultry surgery, whilst purely experimental operations such as caecal abligation and cropectomy, which can only be of interest to research workers, are described. The operation of de-beaking, one of the commonest operations carried out in the poultry yard, receives no mention, nor is it referred to throughout the book.

The ensuing eight chapters dealing with the various diseases and parasites of the fowl: bacterial; viral; protozoal; nutritional; miscellaneous conditions; poisons; internal parasites, and external parasites will be useful alike to veterinarians and non-veterinarians although the former will be disappointed on occasions with the incompleteness of the information provided. This is particularly so in the sections dealing with the diagnosis, treatment and control of diseases, on aspects of which veterinarians will most likely be seeking information.

To quote two instances: In diagnosis of avian encephalomyelitis (epidemic tremors), the authors simply state that " The occurrence of the symptoms listed above in young chicks is suggestive of the presence of avian encephalomyelitis." They fail to remind the reader of the necessity of first eliminating

the possibility of Newcastle disease, and secondly, of the need for differentiating between the infection and nutritional encephalomalacia (crazy chick disease), and although previous note has been made that " microscopic changes may be demonstrated by suitable laboratory technique," the sites and character of these changes are not mentioned.

Similarly in connexion with the diagnosis of coccidiosis more discussion could have been included linking the various species of Coccidia with their usual location in the alimentary canal, and emphasis laid on their varying pathogenicity.

The mere fact of finding oocysts in smears of intestinal contents does not constitute a diagnosis of infection. Furthermore differentiation between species has an important bearing upon treatment and control, and in connexion with treatment, although mention is made of most of the drugs now available commercially for this purpose, no indication is given of recommended dosage, except to say that " medication can be continued for several weeks at low levels, if necessary, without causing any undesirable effects." Surely this statement, in the light of recent work, requires qualification ? The birds themselves may suffer no undesirable effects, but no indication is given as to what constitutes " low levels " of treatment, and no caution given that prolonged medication may give rise to resistant strains of the parasite with the possible breakdown of treatment in future infections, or be a factor in the production of haemorrhagic disease (although the latter possibility receives brief mention in the section of vitamin K under nutritional disorders).

Other small omissions may be mentioned such as the omission of reference to the use of the blood agglutination test in the eradication of fowl typhoid or of its use before treatment or vaccination; nor mention of the use of Ziehl-Neelsen's technique for staining tissue smears for the diagnosis of tuberculosis, or for differentiation between this disease and others producing similar lesions; nor of the technique for staining blood smears to detect the presence of Pasteurella organisms of spirochaetes in the diagnosis of these infections which, if positive, will allow of an immediate diagnosis without recourse to laboratory aid. Again when mentioning the use of antibiotics in the treatment of certain infections the dose, frequency and method of application are frequently omitted.

Finally, the sections on tumours of the fowl is reproduced word for word as in the 1st Edition (1955) and deals solely with terminology. It would surely have added to the usefulness of the book to have added brief descriptions of the gross appearance and common locations of neoplasms likely to be met with in the course of *post-mortem* examinations, and to have included more recent references to their frequency than the sole reference quoted (Feldman, 1927).

The elaboration of these and similar points would greatly have enhanced the value of the book in the esteem of the busy veterinary surgeon consulting its pages for precise information.

The chapters dealing with the various diseases do, however, contain concise and accurate descriptions of the clinical appearances and *post-mortem* lesions to be found in the various ailments afflicting the domestic fowl together with some references to those of turkeys, ducks, geese and game birds. These should prove invaluable for students and practitioners alike. Readers in this country will bear in mind however, that the book describes primarily American experience which may vary from that in Britain, and before adopting recommendations for treatment or control of any disease should ascertain that they do not run counter to existing regulations in this country particularly with reference to the Fowl Pest Order and the Poultry Stock Improvement Plan.

Certain statements may not find general acceptance, as for instance the use of binomials to identify the various viruses. The binomials used are those to be found in the " Manual of Determinative Bacteriology," 6th Edition, Bergey, 1948, but omitted from the 7th Edition published in 1957, having been withdrawn for reconsideration by the International Subcommittee on Viruses. Again the use of the term "Arizona infections" to denote infections with paracolon organisms is not universal.

Chronic respiratory disease (C.R.D.) of poultry is dealt with very briefly, and gives the impression of over-simplification. Its differentiation from other respiratory infections such as infectious coryza, infectious bronchitis, and Newcastle disease is not stressed; and whilst the authors cite a pleuropneumonia like organism (p.p.l.o.) as the cause of the condition, they do not refer to its possible relationship with Nelson's coccobacilliform organism which is stated in a later section of the text to be the cause of one type of infectious coryza characterised by slow onset and long duration. Work in this country indicates that the 2 organisms are one and the same. Similarly the description of the avian leucosis complex differs from the conception gradually gaining acceptance in this country particularly in the statement that the leucoses together with the lymphomatoses (neural, visceral, ocular, and osteopetrotic) arise from a single virus or group of related viruses. This is by no means proved, and there are grounds for considering that totally unrelated viruses may be involved in the causation of the three syndromes, leucosis, neuralymphomatosis and osteopetrosis.

Two omissions from the list of the diseases seem worthy of comment. No mention is made of duck virus hepatitis, a disease which, first observed in 1949, is rapidly becoming one of the major problems of the duck industry; and again no reference made to coliform organisms as possible pathogens in poultry, and especially in coli-granuloma which is frequently met with at autopsy, and requires differentiation from tuberculosis, coccidiosis, and occasionally in turkeys from blackhead.

There is a short appendix dealing with drugs and disinfectants, a subject index, and numerous references to original papers (stated to total more than 800), the latter being grouped at the end of the appropriate chapters.

**Lehrbuch der Vergleichen Anatomie der Haustiere. Volume 3. Gefässlehre, Nervensystem, Sinnesorgane, Haut.** DOBBERSTEIN & KOCH (1958). S. Hirzel, Verlag, Leipzig. (Textbook of comparative anatomy of domestic animals.) Pp. 234. 172 figs, and 3 charts. DM. 15.50.

The authors are the professors of veterinary pathology and anatomy, respectively, in the Veterinary School in the Russian zone in Berlin (the Humboldt University). Volume 1, dealing with bones and muscles, is to appear soon at a cost of about 13 marks. Volume 2 appeared in its second edition in 1954 and cost 9.80 marks; it dealt with the viscera.

The present volume, like the others, is designed as a concise text-book for veterinary students, available at a low price. Judged by the present volume, the book should serve this purpose very well. Almost every page carries a black-and-white drawing, often with vessels shown in red and blue, and there are also two folding charts showing the fore and hind limb of the horse sectioned at six levels with some 70 structures labelled. The horse is taken as the type species but there are abundant references to the ox, pig and dog.

Three subjects taken at random and looked for in the index and text illustrate the scope of the book. Lymphatic drainage of the ruminant stomach—this is dealt with in the text and illustrated in a diagram. Topography of the brain of the pig—this was not dealt with, and the brain illustrated was almost entirely that of the horse. Skin glands of the dog—this was dealt with in a full-page table which listed 13 different kinds of skin glands in domestic animals and their localisation in the different species.

This is not intended as a detailed reference book for the anatomist, like "Sisson" or "Ellenberger and Baum," but a textbook for the student. It is remarkable that the volumes can be produced at such a low price. The paper is not of very good quality and the binding very ordinary, which is hardly surprising.

### ERRATUM

In the abstract "Isolation of Vibrio," etc. (*Vet. Rec.* **70**. 697), the reference is quoted incorrectly. It should read *Amer. J. Vet. Res.* **18**. 575, *not* **68**.

# The Hill Farming Research Organisation

The first report, for 1954-8, published by Oliver & Boyd Ltd., Edinburgh, is an interesting publication of 80-odd pages. It outlines work already started, indicating present progress where possible. It is, of course, an interim report, for such work is essentially long term in character.

The Hill Farming Research Organisation of Palmerston Place, Edinburgh, was established in 1954 as an independent grant-aided research institute to promote and implement a co-ordinated programme of work, subject to the oversight of the Agricultural Research Council, on problems arising from hill farming which require further research. This organisation is under the control of a board of management appointed by the Secretary of State for Scotland, and is constituted of scientists, agriculturists, and farmers from England, Wales, and Scotland. Included is the name of Professor G. F. Boddie, and Dr. J. Russell Greig was a former member.

An earlier investigation of the position of hill and upland sheep farming was undertaken by the De La Warr committee for England and Wales and the Balfour of Burley committee for Scotland. Their reports published in 1944 expressed similar views on the necessity for expanding research and the setting up of a Hill Farming Research Station. It might be recalled that the B.V.A. presented both committees with substantial evidence, and that the Animal Health Division had previously instigated a broad hill sheep survey throughout the country.

In 1945 a Hill Farm Research Committee was appointed for Scotland and acquired 3 hill farms, one in each province of the 3 agriculture colleges.

Two reports were published, the second in 1952 recommending the setting up of this whole-time organisation which has since taken on the 3 farms. The primary function is plant and animal field research. The natural resources of these islands include more than 10,000,000 acres of true hill grazings made up of complex plant communities. Various limiting factors restrict their utilisation: palatability, a short period of growth, mineral and protein deficiencies, and exposure are a few.

The pioneering work of Sir George Stapledon at Aberystwyth has resulted in considerable progress toward hill reclamation, and with statutory financial assistance much has already been accomplished, more in some areas than in others. It appears unlikely for practical and economic reasons that reseeding will be practised on a very wide scale. The effects of surface cultivations and manurial treatment, drainage, bracken destruction, burning, utilisation of in bye and arable land along with the hill pastures proper, practical measures already in force, are being studied more closely.

For extensive areas not so amenable to such treatment the need for a more fundamental approach is recognised. More attention is devoted to ecology and grazing behaviour, and this study of management practices, particularly rates of stocking, on the balance of indigenous species will surely assist in a better understanding of their utilisation, for considerable work on the composition of hill species has already been undertaken from various centres, notably Wales. The hill ewe is a selective grazer so its preference for a particular species is quite disproportionate to the area covered with such herbage. Heather is of course included among these studies. Brynmor Thomas and his colleagues at Newcastle have long since shown that the edible foliage of common heather is more highly efficient in certain ash components than good-quality lowland

grass. Hence the old treatment for pining, the switch from grassy fells on to heather moors.

Bent fescue communities are the most heavily grazed, reaching an early spring peak: nardus during winter. Heather and molinia have two seasonal periods of grazing: during the winter from the lack of alternative supplies, and again in summer coinciding with their most palatable stage of growth.

Incidentally, this summer phase of palatability was quite familiar to older generations of hill folk, and cattle were sent up for this brief period to graze and thrive on molinia.

Radioactive tracers are employed to estimate root development in peaty soils. The high levels of plant radioactivity detected in those localities of high rainfall and soils of low calcium reserves were, however, due to fall-out from hydrogen and atomic bomb explosions.

In the approach to animal studies one point is well stressed: the complexity of the background, the regulated and voluntary movement of the flock, together with its composition of different age groups, require the use of comparatively large numbers for experimentation.

What characteristics should be taken as the basis of genetic selection towards improvement without undue sacrifice of hardiness, survival, and adaptability? However desirable it may appear to establish uniformity of type, nature in her provision for survival provides some degree of underlying heterozygosity. A comparison of Scots Blackface and Cheviot breed types is being undertaken towards some elucidation of this problem, selection.

The 3 farms provide necessary variation in annual rainfall which ranges from 32 to 86 inches.

The primary function of the fleece is protection, which includes good drying out properties; thereafter it is a valuable by-product, albeit a rôle frequently reversed. Whilst the practical implications of fleece structure, in addition to the admixture of wool, hairy and deciduous fibres is well understood among the hills, it is to be hoped that the Organisation will undertake a collaborative and critical study of fleece thermodynamics. This is a subject which has received little attention from the physiologist, and one possibly linked with mycotic dermatitis among other breeds.

Supplementary feeding is approached as a problem of supplementation and not as a substitute for either natural grazings or good husbandry. Roots, hay, concentrate cubes, are fed. The practical difficulties and some disadvantages of undertaking this feeding are fairly discussed. Method of feeding, timing, and regulation present the main operational difficulties. Within the short scope of these studies seasonal variation is very marked, and it is felt that several years' experimentation are necessary before any firm conclusions are drawn. At this stage the observations are regarded more as a guide to further aspects requiring still more intensive controlled investigation; not, it is to be hoped, in sheds.

The adverse effect of bulk in suppressing foraging instinct is again noted. Advantages ascribed purely to supplementary feeding are, however, shared by closer supervision when such feeding is undertaken within enclosures.

The natural hazards of open hill lambing are reflected in the neo-natal mortality 10 to 12 per cent. Dystocia arises from an over-developed single foetus, or in contrast, from the feeble ineffective labour of an impoverished mother. Among lambs that have survived the adventure of birth, accident and poor mothering take their toll.

Flock records support the traditional preferential treatment accorded the younger ewes and to the more weakly among the older age groups. The indoor wintering of hoggs (6 to 18 months old) is resuscitated.

Varying planes of nutrition for hoggs during the winter again confirm their inherent recuperative powers the following summer on natural hill grazings. This is taken a step further: the partition of nutrients and the effects of varying nutritional planes upon the subsequent pattern of skeletal and main tissue growth are considered. The Rowett are undertaking X-ray examination of teeth and skeleton, the results of which will be awaited with considerable interest, including more information on the pelvic girdle. How much attention is paid to the width of the pelvis during selection, or for that matter to teeth?

Dentition is another subject that has been sadly neglected in the past. The condition of broken mouth is prevalent in N.E. Scotland as indeed in other areas. In this district the root feeding of sheep grazing predominantly heather hills is considered the main predisposing managemental factor: as yet there appears no clear genetic predisposition. An alternative supplement is being considered, concentrate cubes and hay replacing roots.

The eternal problem of hill grazing is the excess of summer growth and winter poverty, for unlike the deep-freeze preservation of Alpine districts or the sun-curing properties of more tropical zones, the uneaten herbage deteriorates rapidly. Mixed grazing with cattle is undertaken for topping off rank growth, and another innovation is controlled grazing resembling more the Welsh "Ffrith" practice.

Results confirm the greater prevalence of cobalt pine during wet growing seasons.

Three articles are contributed: a survey of management system and broken mouths in Blackface sheep, a survey of Border Cheviot sheep, and August sward treatments for late grazing.

The report concedes that south of the border different features will need to be considered. This is so; particularly where other and more intensive systems of hill farming are employed with different breeds of sheep, and where the mutual adjustment of hill sheep farming and afforestation is to be considered and studied. How is this to be undertaken?

Once again Scotland has got away to a flying start.

D. T. M.

# News and Comment

## UFAW EASTER CONGRESS

This congress will take place in the Lupton Hall, Leeds, from March 23rd to 26th. The programme includes the following:—

Monday, Opening of Congress by Major C. W. Hume at 4.30 p.m., followed in the evening by a Film Show (including the new film made by UFAW on the control of foot-rot in sheep).

Tuesday, The Management of Laboratory Animals, Mr. G. S. Oury; On Comfort and Comfort Activities in Animals, Dr. W. M. S. Russell (UFAW Research Fellow); The Trade in Tortoises, and Other Problems, Dr. F. Jean Vinter (Technical Secretary of UFAW).

Wednesday, Whole Day Visit to the Experimental Farms of the British Oil and Cake Mills Ltd. at Selby, followed by an Informal Social and Dance.

Thursday, The Transport of Wild Animals, Dr. E. C. Appleby, followed by the Closing Session (Questions and Suggestions).

Those wishing to attend the Congress are asked to write to UFAW, 7a, Lamb's Conduit Passage, London, W.C.1. Fees are: seniors, £3; students, 35s.; part-time visitors, *pro rata*.

## TELEVISION IN AGRICULTURE

At the suggestion of the Organisation for European Economic Co-operation (O.E.E.C.) the British Broadcasting Corporation collaborated with the Ministry of Agriculture in organising at Birmingham a conference, having as its general theme the help which televised programmes can give to farmers and other agriculturists. The conference lasted from February 21st to 26th and was attended by representatives from the following countries and organisations: Austria, Belgium, Canada, Denmark, Eire, France, Germany, Greece, the Netherlands, Portugal, Sweden, Switzerland, the United Kingdom, U.S.A., Yugoslavia, India, F.A.O., the European Association of Agricultural Journalists, the Australian Broadcasting Corporation, the N.F.U., the Independent Television Authority, the Ministry of Agriculture, and O.E.E.C. It is pleasant to record that a prominent part was played by a member of the profession, Mr. E. C. Straiton, who was asked to demonstrate the preparation of one of the veterinary films which form a regular part of the B.B.C. television farming programmes on Sundays.

Mr. Straiton and his professional associates made the film on his own premises, and were watched by a large and very interested international audience. At the end a vote of thanks was proposed by Mr. Jules S. Renaud, Supervisor of Television Production in the U.S. Department of Agriculture. Mr. Straiton addressed the delegates briefly.

Towards the end of the week some 30 films made in the different countries represented were shown and that made by Mr. Straiton may be seen tomorrow, Sunday, on the B.B.C.'s midday farming programme. A senior official of the B.B.C. described it as the best film to be shown during the conference, and said that at its termination the delegates broke into spontaneous and prolonged applause.

## PROFESSOR LAMONT HONOURED

His many friends will learn with pleasure that Professor H. G. Lamont has been appointed Chief Scientific Officer to the Ministry of Agriculture of Northern Ireland, in succession to Professor R. G. Baskett. He will take up his new duties in the summer. It is a compliment to the profession that this eminent veterinarian has been chosen for this important appointment.

## PERSONAL

### Births

BRIDGES.—On March 1st, 1959, to Barbara, wife of Gordon D. Bridges, B.V.M.S., M.R.C.V.S., of 2, Bedford Villas, Springhill, Tavistock, Devon, a daughter. Ann Maureen.

CORNWELL.—On March 1st, 1959, at Heswall Maternity Home, to Dorothy, wife of R. L. Cornwell, B.V.SC., M.R.C.V.S., a son, brother for Nigel and Bryony.

DENHAM.—On February 26th, 1959, to Esther M. H. Denham, M.R.C.V.S., and Peter Denham, of 68, Norton Road, Letchworth, Herts., a daughter, Sarah Mellor.

FROYD.—On January 31st, 1959, to Ruth, wife of Gerald Froyd, M.R.C.V.S., of the Veterinary Research Laboratory, Kabete, Kenya, a daughter, Frances Miriam.

MALLALIEU.—On February 28th, 1959, to Ruth, wife of John Mallalieu, B.SC., M.R.C.V.S., of 8, Appleton Gate, Newark, a son, Christopher John.

OWEN.—On February 20th, 1959, at Prizet House, Kendal, Westmorland, to Pamela and Anthony Owen, MS.R.C.V.S., a son, Anthony George, brother to Charlotte and Peter.

TYRRELL.—On February 21st, 1959, at 24, Manor Road, Dorchester, to Mary, wife of Ken Tyrrell, B.A., B.SC., M.R.C.V.S., a son, James, a brother for Hugh and Guy.

## UNIVERSITY NEWS

### Cambridge

Messrs. Allen and Hanbury Ltd. are providing a prize to consist of books to the value of £20, for presentation to a student reading for the Vet.M.B. degree at Cambridge who has done the best work in veterinary parasitology. The first award will be made in December, 1959.

## R.C.V.S. OBITUARY

We record with regret the death of the following member of the profession:—

BAGENAL, Beauchamp, M.R.C.V.S. Graduated 1946, Royal Veterinary College, London. Died February 21st, 1959.

### Mr. Beauchamp Bagenal

*Dr. Weitz writes:—*

The unexpected news of the untimely death of Beauchamp Bagenal will be a great shock to his many friends in the profession. Beachie, as he was known to his colleagues, had a sense of loyalty and an integrity of mind which is quite rare; and these qualities, coupled with his innate love of nature, evoked in him a particular charm which fitted his rather dreamy appearance. He showed the urgency of his sense of duty by joining the R.A.F. a few months before he was due to take his final examinations. This step, which he took in the face of some opposition, cost him almost 5 years' seniority in his professional training. He returned to college after serving as a pilot in Bomber Command and, when qualified, joined the veterinary service in Kenya. The routine nature of the work and the lack of independence did not suit him although he was very fond of Africa. More recently he retired voluntarily from the service to develop a farm which he bought on the Kenya-Uganda border at Kitale. There he found the reward for the sacrifice of a rather easier life of a veterinary officer and was challenged by the task in front of him. It is particularly sad that he died just at a time when the results of his and his wife's labours on the farm were starting to show some rewarding results. Many who know his widow as Elizabeth Maxted will associate themselves with his friends in deep-felt sympathy for her tragic bereavement.

## THE NUTRITION SOCIETY

The Scottish Group of the Nutrition Society is holding a symposium on "Obesity" in Glasgow on Saturday, April 4th. Those interested, who are not already members of the Society, are invited to write for further particulars to Dr. J. Davidson, The Rowett Research Institute, Bucksburn, Aberdeenshire.

## ANNUAL BALL AT LIVERPOOL

The annual ball of the Liverpool University Veterinary Society was held in the Students' Union on February 27th. This year the decoration theme was "Hell" and guests danced under the hooves of a flying horse bearing an effigy of the master of iniquity himself. However, the surroundings did not seem to provoke much apprehension, and a gay evening was enjoyed. There was a good attendance by members of the staff, including the Dean, Professor Wright. Many members of the profession were present as well as the students, and guests had, in many instances, travelled considerable distances to be present. Welcome guests were the representatives of Glasgow University Veterinary Society. At 2 p.m. the ball ended and the warmth of "Hell" was exchanged for the rather less sultry Merseyside air.

## NEW RESEARCH INSTITUTE IN GENEVA

An American chemical and pharmaceutical manufacturer has announced in Geneva the completion of plans for a basic research laboratory, to be known as Cyanamid European Research Institute, Inc.

The new scientific centre is to employ, British, Swiss, French, German, and other European scientists, and will be solely devoted to long-range research in the chemical and biological sciences.

It is intended to employ six or seven senior scientists who will be selected from different fields and from different countries, and each will become the head of a department.

The Company reports that the first total synthesis of a tetracycline, biologically active and related to aureomycin, has been achieved. This is described as "an important scientific breakthrough which could lead to the construction of new antibiotics, all of which heretofore have been derived from living organisms."

## ERRATUM

In the letter published last week over the signatures of A. N. Worden and T. F. Reid, we are asked to point out that in the fifth line of the fourth paragraph (column 2), 40 per cent. should have read *50* per cent. Later in the same paragraph 14 degrees of freedom should have read *22* degrees.

## COMING EVENTS

### March

10th (Tues.). Annual General Meeting of the Eastern Counties Veterinary Society at the Bell Hotel, Norwich.

11th (Wed.). A meeting of the North Wales Division will be held at the Gwydir Hotel, Bettws-y-Coed at 2 p.m.

12th (Thurs.). Annual General Meeting of the Western Counties Veterinary Association at the Rougemont Hotel, Exeter, at 2 p.m.

Meeting of the Clinical Club, West of Scotland Division, at the University Veterinary School, 83, Buccleuch Street, Glasgow, C.3, at 7.30 p.m.

13th (Fri.). General Meeting of the Midland Counties Division at Regent Hotel, Leamington Spa, at 2.30 p.m.

18th (Wed.). Annual General Meeting of the Scottish Metropolitan Division in the Royal (Dick) School of Veterinary Studies, 2.45 p.m.

Meeting of the Southern Counties Veterinary Society at the Grand Hotel, Bournemouth, 7.30 p.m.

19th (Thurs.). General Meeting of the Society of Practising Veterinary Surgeons at the Grand Hotel, Peterborough, at 2.30 p.m.

20th, 21st and 22nd (Fri., Sat. and Sun.). Conference of the British Small Animal Veterinary Association in London.

25th (Wed.). Spring Meeting of the Lincolnshire and District Division at Eastgate Court Hotel, Lincoln, at 2.15 p.m.

Ordinary Meeting of the Sussex Veterinary Society at the Old Ship Hotel, Brighton, 2.30 p.m.

General Meeting of the Lancashire Veterinary Association at Alderley Park, Cheshire, 2.30 p.m.

**April**

1st (Wed.). Meeting of the R.A.V.C. Division at Glaxo Laboratories Ltd., Greenford, Middlesex, at 11 a.m.

2nd (Thurs.). General Meeting of the Society of Practising Veterinary Surgeons at Langford, Bristol.

2nd and 3rd (Thurs. and Fri.). The 21st Ordinary General Meeting of the A.V.T. and R.W's. will be held at the Gleneagles Hotel, Scotland, at 10 a.m.

4th (Sat.). Symposium of the Scottish Group of the Nutrition Society in Glasgow.
13th Annual Dinner of the B.R.X. Club at the Royal Veterinary College, 6 p.m.

8th, 9th and 10th (Wed., Thurs., and Fri.). B.V.A. Committee and Council Meetings in Edinburgh.

25th (Sat.). Meeting of the B.S.A.V.A. North West Region at the Stork Hotel, Liverpool.

**August**

**30th to 5th September. 77th Annual Congress of the British Veterinary Association in Folkestone. (Official opening Monday, August 31st.)**

## B.V.A. COMMITTEE AND COUNCIL MEETINGS IN EDINBURGH

**Wednesday, April 8th, 1959—at The Royal (Dick) School of Veterinary Studies**

10.00 a.m. Farm Livestock Committee.
11.30 a.m. Parliamentary and Public Relations Committee.
2.15 p.m. Small Animals Committee.
5.00 p.m. Finance Sub-committee.

**Thursday, April 9th, 1959—at The Royal (Dick) School of Veterinary Studies**

10.00 a.m. Home Appointments Committee.
11.30 a.m. Veterinary State Medicine Committee.
2.15 p.m. General Purposes and Finance Committee.

**Friday, April 10th, 1959—at The Royal (Dick) School of Veterinary Studies**

10.00 a.m. Council Meeting.

## ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

### Anthrax

*Staffs.* Naychurch Farm, Upper Hulme, Leek (Feb. 24); The Limes, Lullington, Burton-on-Trent (Feb. 26).

*Suffolk.* Perry Barn Farm, Sproughton, Ipswich (Feb. 27).

### Foot-and-Mouth Disease

*Yorks.* Prospect Farm, Haverah Park, Harrogate (Feb. 26).

### Fowl Pest

*Essex.* 3, Ramsey Road, Halstead (Feb. 26).

*Norfolk.* Whitehouse Farm, Syleham (Feb. 28).

*Staffs.* Fairfield Farm, Walton-on-Trent (Feb. 28).

*Surrey.* Old Lodge Farm, Woodmansterne Lane, Wallington (Mar. 2).

### Swine Fever

*Ches.* Newtown, Tiverton, Tarporley (Feb. 25); Holly Bank, Brown Knowle, Broxton (Mar. 2).

*Denbigh.* Yew Tree Cottages, Singrett, Llay, Wrexham (Feb. 24); Manor Farm, Worthenbury, Wrexham (Feb. 25).

*Devon.* West Town Farm, Whitestone, Exeter (Feb. 26).

*Essex.* Wadham Park Farm, Church Road, Hockley (Feb. 25); Hubbards Close Piggeries, Hubbards Close, Hornchurch (Feb. 2).

*Gloucs.* Mount Pleasant Farm, Longwell Green, Bristol (Feb. 27).

*Kent.* Little Telpits, Grafty Green, Maidstone (Feb. 26).

*Herts.* Sheepcote Farm, Lower Road, Gt. Amwell, Ware (Feb. 24).

*Lancs.* Town Lane Holdings, Southport (Feb. 24); Halsnead Piggeries, Halsnead Park, Whiston, Prescot (Feb. 25).

*Northants.* Cantors Doles Farm, Beals Drove, Black Bush, Whittlesey, Peterborough (Mar. 2).

*Somerset.* Trivett Farm, Cossington, Bridgwater (Feb. 25); Biddisham Lane, Biddisham, Axbridge (Feb. 27).

*Surrey.* 4a, High Street, West Molesey (Feb. 24); Bethlem Royal Hospital, Monks Orchard Road, Shirley (Feb. 25); Home Farm, Beaumont College, Englefield Green, Egham (Feb. 26); 19, Cox Lane, West Ewell, Epsom (Mar. 2).

*Yorks.* Chatt House, Burton Pidsea, Hull (Feb. 26); East Farm, Shelley, Huddersfield (Mar. 2).

## DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

**Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases**

| Period | | Anthrax | Atrophic Rhinitis | Foot-and-Mouth | Fowl Pest | Sheep Scab | Swine Fever |
|---|---|---|---|---|---|---|---|
| 1st to 15th Feb., 1959 | | 9 | — | — | 67 | — | 41 |
| Corresponding period in | 1958 | 7 | — | 36 | 32 | — | 33 |
| | 1957 | 19 | 2 | 1 | 37 | — | 39 |
| | 1956 | 171 | 1 | — | 15 | — | 20 |
| 1st Jan. to 15th Feb., 1959 | | 21 | — | — | 147 | — | 125 |
| Corresponding period in | 1958 | 22 | — | 79 | 152 | — | 139 |
| | 1957 | 51 | 2 | 11 | 162 | — | 109 |
| | 1956 | 288 | 1 | — | 112 | — | 78 |

# Letters to the Editor

*The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.*

### The R.C.V.S. and the B.V.A.

Sir,—Mr. J. R. Mitchell might well have added to his letter in your issue of February 21st that whilst "one cannot deny that many abattoirs in the United Kingdom are outdated," etc., yet the animals slaughtered therein are at least rendered unconscious by humane means before being bled to death. Legislation in "backward" Britain is at least a quarter of a century ahead of Canada in that respect. Packers in that country are still using methods abandoned in Britain 30 years ago!

Yours faithfully,
D. J. ANTHONY.

Fir Tree House,
42, South Road,
Stourbridge,
Worcs.
*February 23rd*, 1959.

### The Meat (Staining and Sterilisation) Regulations, 1959

Sir,—In THE VETERINARY RECORD dated February 21st, Mr. Bywater, when referring to these Regulations, mentions that the City of Birmingham was the first local authority to require the cooking of meat sold for animal feeding. This by-law came into force in July, 1950, and I must correct Mr. Bywater's statement that no provision was made in it to allow zoological gardens to have raw meat for their animals. Actually, both zoological gardens and menageries were given exemption.

Yours faithfully,
C. G. ALLEN.

City of Birmingham Veterinary and Food Inspection Department,
7, St. Martin's Lane,
Birmingham, 5.
*February 24th*, 1959.

### Skin Grafts as an Aid to Intestinal Anastomosis

Sir,—To comment adversely on the report of any new technique is to invite condemnation as a reactionary. Nevertheless, novelty is commonly confused with progress, and we consider, therefore, that certain features of the technique described recently in your journal under the title "Skin Grafts as an Aid to Intestinal Anastomosis" (Lewis, D. G., 1959) should not be allowed to pass unchallenged.

We consider that in his article Mr. Lewis has:—

(a) Exaggerated the dangers and difficulties of conventional methods of end-to-end anastomoses.

(b) Advocated a procedure which contravenes without good cause certain well-established principles of surgical technique.

Referring to these dangers and difficulties he says, "in view of previous rather miserable results with a variety of other methods (*of bowel anastomosis*) . . ." It is not clear whether this statement is intended to cover only Mr. Lewis's personal experience of other methods of bowel anastomosis, or to describe the general experience of the veterinary profession. In either case we suggest that end-to-end anastomosis by the method described by Markowitz (1949) is both easy and safe. The series of anastomoses carried out on dogs in this Department over the past 3½ years, though small, tends to support our contention. Ten end-to-end anastomoses were performed by 4 different surgeons using Markowitz's method. Of these, 7 were completely successful, 1 died after surviving in good health for 6 months post-operatively (no *post-mortem* examination was performed), and 2 died following surgical interference. In both the fatal cases perforation of bowel had occurred before operation, resulting in contamination of peritoneum with faecal material. In only one of them, however, was there any *post-mortem* evidence of leakage from the anastomosis line. It is perhaps relevant to mention that in one of the successful cases a second end-to-end anastomosis was performed 6 weeks after the first, when it was found that a second foreign body had obstructed small bowel *distal* to the previous anastomosis, after negotiating the latter successfully.

The new technique appears to us to be open to objection on several grounds. Study of the original article by Armistead (1956) makes it clear that the author performed the operation on only 3 experimental dogs. In all of these some degree of constriction of the lumen of the bowel was found at *post-mortem* examination 6 weeks to 6 months after operation. In the only case for which measurements are given this constriction resulted in a reduction of the cross-sectional area of the bowel at the site of anastomosis of about 40 per cent. (*i.e.* reduction of circumference from 5.2 to 4.0 cm.).

Armistead goes on to say that at the end of 6 months the wall of the bowel at the site of anastomosis was "fairly pliable," but gives no indication whether its elasticity was affected. If this were in any way impaired the *effective* reduction of the lumen might well be even greater than that suggested by the figures already quoted.

In all three of Armistead's experiments the omentum became adherent to the anastomosis line. It is difficult to understand, therefore, why it should be considered necessary to subject an animal to an additional operation to remove skin from its thigh, and to introduce into the peritoneal cavity this skin which has been completely deprived of its blood supply, and which cannot be rendered entirely aseptic by any known means. If the surgeon is uncertain of the integrity of his anastomosis he is surely better advised to mimic nature by reinforcing his suture line with sterile omentum held in place by a few sutures?

We clearly recognise that without the occasional sacrifice of a well-established principle no progress

would ever be made. Nevertheless, before such a sacrifice is made its necessity should be clearly established. In our opinion this has not been done in the present instance. Indeed we submit that until the results of the new method of anastomosis have been compared with those of conventional methods in an adequately controlled series of cases it should continue to be regarded as Armistead obviously regarded it; merely as an interesting experimental procedure. Yours faithfully,

L. W. HALL,
M. C. G. LITTLEWORT.

University of Cambridge,
Department of Veterinary Clinical Studies,
School of Veterinary Medicine,
Madingley Road,
Cambridge.
*February 24th*, 1959.

**References**

ARMISTEAD, W. W. (1956). *N. Amer. Vet.* **37**. 968-78.
LEWIS, D. G. (1959). *Vet. Rec.* **71**. 102.
MARKOWITZ, J. (1949). "Experimental Surgery." 2nd ed. P. 76. Baltimore: The Williams & Wilkins Co.

**Clinical Problems in Everyday Practice**

Sir,—Under the sub-section, "A New Approach to the Surgical Treatment of Haematoma in Dog and Cat," a contributor to this symposium, Mr. J. Marshall, of Putney, describes the "shirt button method" as "a new approach."

It would appear that Mr. Marshall has not yet experienced that somewhat disconcerting side reaction which, without the writer's knowledge, was given a nation-wide publicity *via* the Kemsley Press on April 1st, 1952, of which the reproduced press cutting is an example. It is quoted, by permission, from the *Newcastle Journal*.

"That's nothing—just wait until they see me. . . ."

"A large grey tom was walking yesterday in the Broadway, Whitley Bay, when suddenly a woman shopper noticed—there were six pearl buttons sewn on to his ears.

"Three women rushed the cat to the Whitley Bay Cat and Dog Home, and insisted, before they would leave the building, that Mr. Jim Pearson should cut the abominable buttons from its ears.

"Mr. Frank Pearson, owner of the home, arrived, and rang up the R.S.P.C.A. in Newcastle. Inspector R. P. Nairn advised Mr. Pearson to take the animal to Miss Jean Pinkney, the local veterinary surgeon.

"And then it all came out. Miss Pinkney herself had sewn the buttons on to keep the cat from getting cauliflower ears after an operation. She sewed them on carefully under an anaesthetic four days ago, before the patient was sent home to recuperate, and was furious when she saw they had gone.

"Last night the cat submitted, patiently, but a little superciliously, to having his buttons sewn on for a second time.

This question's Cat-egorical—it's far from Cat-astrophic,
Nine lives embellished all in one is fine:
Besides, it matches my fur coat . . . it's purely philanthropic—
Far better casting pearls to cats than swine!
It hasn't hurt my feelings—many women sport an earring,
And purr like me to leave their rivals flat:
I'm coming up to scratch—it hasn't really hurt my hearing,
And now they've found the way to "Belle the Cat!"

B. U."

I make no claim to being the originator of the "shirt button method"; this claim rightly belongs to Professor George Dykes. This method is only one of the very many clinical wrinkles which he freely demonstrated to the generations of students who studied under him of whom I am one, and from the date of his qualification Mr. Marshall is, in all probability, another. Yours faithfully,

JEAN M. PINKNEY.

19, Ayre's Terrace,
North Shields,
Northumberland.
*February 16th*, 1959.

**Semen Collection from Boars**

Sir,—Your readers may have noted from various reports in the literature the apparently complicated apparatus required to collect semen samples from the boar. Since there is quite a demand for semen examination in this animal the following description of a simpler technique may be of interest to them.

The apparatus consists of a smooth latex cone made to fit the normal bovine artificial vagina, 7½ inches long and 2¾ inches in diameter at its wider end, and an aluminium bull ring 2¾ inches in diameter. The cone is inserted into the ring until a good fit is obtained. The free portion of the wider end is then turned back over the ring.

The cone is held in the hand with the covered ring outside one's first finger and thumb, and the remainder of the cone gripped tightly. The boar is allowed to serve into the cone and his penis is grasped very tightly with one's fingers. After a little practice in preventing escape of the spiral from one's hand, ejaculation takes place very quickly.

We have used this method, which is modelled on that used by the Japanese workers, since October, 1958, and since then semen volume and density per ejaculate have increased markedly.

Yours faithfully,
V. J. A. MANTON.

Cambridge and District Cattle Breeders Limited,
The Gravel Pits,
Huntingdon Road,
Cambridge.
*March 3rd*, 1959.